

**(54) FIBER OPTICAL PHASE MODULATOR**

(11) 57-85004 (A) (43) 27.5.1982 (19) JP  
(21) Appl. No. 55-161530 (22) 17.11.1980  
(71) NIPPON DENKI-K.K. (72) YOSHINORI OOTA  
(51) Int. Cl. G02B5/14//G02B5/00,G02F1/03

**PURPOSE:** To obtain a fiber optical phase modulator having high efficiency and high band width, by providing an electrodeless part on the center part in the axial direction of one cylinder of driving electrodes provided on both the inside and outside surfaces of a cylindrical piezoelectric ceramic vibrator, and also winding an optical fiber around the center part of the outside cylindrical surface.

**CONSTITUTION:** On the inside and outside cylindrical surfaces of a cylindrical piezoelectric ceramic vibrator, driving electrodes 5 and 4 are provided, and the center part in the axial direction of the outside cylindrical surface is electrodeless. An optical fiber consisting of an optical fiber strand 1 and coating 2 is wound around this center part. In this case, the electrodeless part is set to about 1/3 of the overall length. In this way, a fiber optical phase modulator having high efficiency and high band width is obtained.

